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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
ULLAH, ELIAS	
ART UNIT	**PAPER NUMBER**
2892	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/507,321	FUJII ET AL.	
	Examiner	Art Unit	
	ELIAS ULLAH	2892	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 October 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *56-111* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *56-111* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 June 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *8/21/2009/, 10/6/2009 and 12/4/2009*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/5/2009 has been entered.

Double Patenting

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claims 56, 64, 72, 88 and 100 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-38 of U.S.

Patent No. 6,992,026 in view of Hoekstra et al. (Hoekstra, US 6,420,678). Although the conflicting claims are not identical, they are not patentably distinct from each other because the limitation as recited in the claims of the instant application is recited in the noted claims of the '026.

4. Claims 56, 64, 72, 88 and 100, Fukuyo teaches a substrate dividing method comprising the steps of: irradiating a laser light incident (claim 1) face of a substrate (claim 2) with laser light (claim 1) while positioning a light-converging point (claim 1) within the substrate 4(claim 2), so as to form a modified region (claim 1) only within the substrate (claim 2), and causing substrate the modified region (claim 1) forming a starting point region (claim 1) for cutting the substrate inside the substrate at a predetermined distance (claim 1) from the laser light incident face (claim 1) of the substrate; and dividing the substrate (claim 2) direction of the substrate (claim 2) from the starting point region (claim 2) for cutting reaches the laser light incident face and rear face of the substrate (claim 2) and wherein the substrate is irradiate with a pulse width of 1us or less (claim 2), substrate is irradiated with the laser light under a condition with a peak power density of at least 1×10^8 (W/cm2) (claim 2).

However, Fukuyo fails teach grinding step after the step of forming the starting point. At the time the invention was made, it would have been obvious to a person having ordinary skill in the art to use grinding step for cutting a substrate as taught by Hoekstra in col. 2, lines 10-15) in the method dividing substrate of Fukuyo, because such grinding process will able to divide a substrate into plurality of pieces in the laser cutting.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 56-57, 59-60, 63, 65 69-73, 75-76, 79, 81, 85-87 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoekstra et al. (Hoekstra, US 6,420,678).

With regard to claims 56, 65 72, 81 and 87, Hoekstra teaches a substrate dividing method comprising the steps of: irradiating a laser light incident 34 (Fig. 4, col. 5, lines 45-50) face of a substrate 4 (Fig. 4, lines 59-61) with laser light 34 while positioning a light-converging point 35 within the substrate 4 (Fig. 4), so as to form a modified region (wherein void 37 is formed) only within the substrate 4, and causing substrate 4, the modified region (wherein void 37 is formed) forming a starting point region (Fig. 4, col. 6, lines 1-6 wherein laser may be aligned from a first edge of the

substrate for starting point) for cutting the substrate inside the substrate at a predetermined distance (Fig, 4, col. 5, lines 55-65) from the laser light incident 34 face of the substrate 4; and dividing the substrate 4 (col. 6, lines 25-29) wherein the substrate 4 is divided when a fracture generated in a thickness col.5, lines 55-65) direction of the substrate 4 from the starting point region (Fig. 4, col. 6, lines 1-6 wherein laser may be a lined from a first edge of the substrate for starting point) for cutting reaches the laser light incident face and rear face of the substrate 4 (col. 6, lines 10-13).

Hoekstra teaches forming the starting point region (Fig. 4, col. 6, lines 1-6 wherein laser may be allied from a first edge of the substrate for starting point) such that the substrate 4 comprises at least a portion of the modified region (wherein void 37 is formed), but fails to teach in the same embodiment for grinding step the substrate after the starting point region.

However, Hoekstra teaches after used a high power laser beam is applied (col. 1, 65+) a secondary steps such as grinding can be done for cutting a glass substrate (co. 2, lines 10-15). At the time the invention was made, it would have been obvious to a person having ordinary skill in the art to use grinding step for cutting a substrate as taught by Hoekstra in col. 2, lines 10-15) and grinding step remove the modified region (see col. 2, lines 10-15 wherein after creating fracture, further grinding process will remove modified region wherein void is generated see also US 2002/0115235, Figs. 12(A) to 12(D) wherein modified region G is removed by grinding). Furthermore, a

grinding steps is typical process after a laser irradiation see (2002/0115235, Figs. 12(A) - 12(D), [0010]).

The recitation of "the modified region includes a refractive index change region which is a region with a changed refractive index" is only a statement of the inherent properties of the instant process of Nd: YAG laser pulse e.g. Nd: YAG laser on a glass substrate (col. 1, lines 25-230) and peak power density of Piwczyk. The process recited in "laser processing e.g. ND: YAG" is substantially identical (see instant application US 2005/0272223 in [0106]) to that of the claims, claimed properties or functions are presumed to be inherent. Or where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established. *In re Best*, 195 USPQ 430, 433 (CCPA 1977) and MPEP 2112.02.

With regard to claims 57 and 73, Hoekstra teaches a substrate dividing method wherein the substrate 4 is a semiconductor substrate (col. 4, lines 30-32).

With regard to claims 59, 75, Hoekstra teaches a substrate dividing method wherein the modified region is a molten processed region (col. 6, lines 1-3).

With regard to claim 60, 76, Hoekstra teaches a substrate dividing method wherein the substrate is an insulating substrate (col. 4, liens 30-32 wherein sapphire is insulated substrate, see instant application publication number US 2005/0272223 at [0012]).

With regard to claim 63, 79 Hoekstra teaches a substrate dividing method wherein the modified region includes a crack region (col. 6, lines 10-12).

With regard to claims 69-71 and 85-86, Hoekstra teaches a substrate dividing method wherein the substrate is divided into a plurality of chips (col. 1, lines 29-31) along lines 45 (Fig. 16) along which the substrate 4 is divided and the liens 45 being arranged in a lattice for the substrate 4 and the substrate is divided when the fracture reaches the front face and rear face of the substrate 4 (col. 6, liens 10-15) after step of grinding the substrate (see above claim 56 discussion).

8. Claims 61-62, 77-78 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoekstra et al. (Hoekstra, US 6,420,678) in view of Chen et al. (US 2003/0141570).

With regard to claims 61-62, 77-78 Hoekstra teaches a substrate dividing method wherein the rear face of the substrate 4 is ground (substrate inherently on a carrier in order to grinding) in the step of grinding the substrate (see above claim 14 discussions). Hoekstra fails to teach the front face of the substrate is formed with a functional device grinding is done by a chemical etching.

Chen teach the front face of the substrate is formed with a functional device 21 (see abstract) grinding is done by a chemical etching [0006]. At the time the invention was made, it would have been obvious to a person having ordinary skill in the art to use a chemical etching process fro grinding a substrate teaching of Chin in the Hoekstra substrate dividing, because such process is well-known in the art as taught by Chen in [0006].

9. Claims 58, 64, 66, 74, 80, 82 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoekstra et al. (Hoekstra, US 6,420,678) in view of Piwczyk et al. (US 6,376,797).

With regard to claims 58, 64, 66, 80 and 82 Hoekstra teaches a substrate dividing method wherein the substrate is irradiate with a pulse width of 1us or less (col. 6, lines 26-30), but fails to teach the substrate is irradiated with the laser light under a condition with a peak power density of at least 1×10^8 (W/cm2).

Piwczyk teaches Nd: YAG laser with a peak power density of 9×10^9 W/cm^2 for creating micro crack (col. 4, lines 20-40). At the time the invention was made, it would have been obvious to a person having ordinary skill in the art to use a Nd: YAG laser with a peak power density of 9×10^9 W/cm^2 for creating micro crack teaching of Piwczyk in the laser processing method of Hoekstra because Hoekstra Nd: YAG laser (col. 6, lines 24-30) can be used for a peak power density of 9×10^9 W/cm^2 for creating micro crack for cutting a substrate.

10. Claims 67, 83 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoekstra et al. (Hoekstra, US 6,420,678) in view of Hatangadi et al. (Hatangadi, US 6,726,631).

With regard to claims 67 and 83, Hoekstra teaches a substrate dividing method wherein the substrate 4 (Fig. 4) but fails to teach the substrate is made of piezoelectric material.

However, Hatangadi teaches the substrate 130 (Fig. 3) is made of piezoelectric material (col. 10, lines 10-25). At the time the invention was made, it would have been

obvious to a person having ordinary skill in the art to replace Hoekstra's glass substrate 4 with a piezoelectric substrate of Hatangadi in the substrate dividing method of Hoekstra, because a piezoelectric substrate is able create variable cut size in the laser cutting as taught by Hatangadi in (col. 10, lines 10-30).

11. Claims 68 and 84 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoekstra et al. (Hoekstra, US 6,420,678) in view of Hatangadi et al. (Hatangadi, US 6,726,631) and further in view of Piwczyk et al. (US 6,376,797).

With regard to claims 68, and 84, Hoekstra teaches a substrate dividing method wherein the substrate is irradiate with a pulse width of 1us or less (col. 6, lines 26-30), but fails to teach the substrate is irradiated with the laser light under a condition with a peak power density of at least 1 x 10^8 (W/cm2).

Piwczyk teaches a Nd: YAG laser with a peak power density of 9 x 10^9 W/cm^2 for creating micro crack (col. 4, lines 20-40). At the time the invention was made, it would have been obvious to a person having ordinary skill in the art to use a Nd:YAG laser with a peak power density of 9 x 10^9 W/cm^2 for creating micro crack teaching of Piwczyk in the laser processing method of Hoekstra because Hoekstra Nd:YAG laser (col. 6, lines 24-30) can be used for a peak power density of 9 x 10^9 W/cm^2 for creating micro crack for cutting a substrate.

12. Claims 88, 90, 93, 95, 97-99,100, 102, 105, 107 and 109-111 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoekstra (US 6,420,678) and in view of Manor (US 2001/0035401).

With regard to claims 88, 95, 97-99, 107 and 109-111 Hoekstra teaches Hoekstra a substrate dividing method comprising the steps of: irradiating a laser light incident 34 (Fig. 4, col. 5, lines 45-50) face of a substrate 4 (Fig. 4, lines 59-61) with laser light 34 while positioning a light-converging point 35 within the substrate 4 (Fig. 4), so as to form a modified region (wherein void 37 is formed) only within the substrate 4, and causing substrate 4, the modified region (wherein void 37 is formed) forming a starting point region (Fig. 4, col. 6, lines 1-6 wherein laser may be aligned from a first edge of the substrate for starting point) for cutting the substrate inside the substrate at a predetermined distance (Fig, 4, col. 5, lines 55-65) from the laser light incident 34 face of the substrate 4; and dividing the substrate 4 (col. 6, lines 25-29) wherein the substrate 4 is divided when a fracture generated in a thickness col.5, lines 55-65) direction of the substrate 4 from the starting point region (Fig. 4, col. 6, lines 1-6 wherein laser may be a lined from a first edge of the substrate for starting point) for cutting reaches the laser light incident face and rear face of the substrate 4 (col. 6, lines 10-13).

Hoekstra teaches forming the starting point region (Fig. 4, col. 6, lines 1-6 wherein laser may be aligned from a first edge of the substrate for starting point) such that the substrate 4 comprises at least a portion of the modified region (wherein void 37 is formed), but fails to teach in the same embodiment for grinding step the substrate after the starting point region. And Hoekstra further fails to teach a surface formed with at least one semiconductor device.

However, Hoekstra teaches after used a high power laser beam is applied (col. 1, 65+) a secondary steps such as grinding can be done for cutting a glass substrate (co. 2, lines 10-15). At the time the invention was made, it would have been obvious to a person having ordinary skill in the art to use grinding step for cutting a substrate as taught by Hoekstra in col. 2, lines 10-15) and grinding step remove the modified region (see col. 2, lines 10-15 wherein after creating fracture, further grinding process will remove modified region wherein void is generated see also US 2002/0115235, Figs. 12(A) to 12(D) wherein modified region G is removed by grinding). Furthermore, a grinding steps is typical process after a laser irradiation see (2002/0115235, Figs. 12(A) - 12(D), [0010]).

Manor teaches cutting a substrate 100 (Fig. 3A) wherein semiconductors wafer 100 comprises plurality of chips on the wafer 100) and in order to provide at least one manufactured semiconductor device [0007]. At the time the invention was made, it would have been obvious to a person having ordinary skill in the art to cut substrate comprises a semiconductor device teaching of Manor in laser processing method of Hoekstra, because such substrate comprises plurality device are conventional as taught by Manor in [0007].

The recitation of “the modified region includes a refractive index change region which is a region with a changed refractive index" is only a statement of the inherent properties of the instant process of Nd: YAG laser pulse e.g. Nd: YAG laser on a glass substrate (col. 1, liens 25-230) and peak power density of Piwczyk. The process recited in “laser processing e.g. ND: YAG” is substantially identical (see instant application US

2005/0272223 in [0106]) to that of the claims, claimed properties or functions are presumed to be inherent. Or where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established. *In re Best*, 195 USPQ 430, 433 (CCPA 1977) and MPEP 2112.02.

With regard to claims 90 and 102, Hoekstra teaches Hoekstra a substrate dividing method wherein the modified region is a molten processed region (col.6, lines 1-5).

With regard to claims 93 and 105 Hoekstra teaches Hoekstra a substrate dividing method wherein the modified region includes a crack region (col. 6, lines 10-15).

13. Claims 91-92 and 103-104 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoekstra et al. (Hoekstra, US 6,420,678) in view of Chen et al. (US 2003/0141570).

With regard to claims 91-92 and 103-104, Hoekstra teaches a substrate dividing method wherein the rear face of the substrate 4 is ground (substrate inherently on a carrier in order to grinding) in the step of grinding the substrate (see above claim 14 discussions). Hoekstra fails to teach the front face of the substrate is formed with a functional device grinding is done by a chemical etching.

Chen teach the front face of the substrate is formed with a functional device 21 (see abstract) grinding is done by a chemical etching [0006]. At the time the invention was made, it would have been obvious to a person having ordinary skill in the art to use

a chemical etching process fro grinding a substrate teaching of Chin in the Hoekstra substrate dividing, because such process is well-known in the art as taught by Chen in [0006].

14. Claims 89, 94, 96, 101, 106 and 108 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoekstra (US 6,420,678) and in view of Manor (US 2001/0035401) and further in view of Piwczyk et al. (US 6,376,797).

With regard to claims 89, 94, 96, 101, 106 and 108, Hoekstra teaches a substrate dividing method wherein the substrate is irradiate with a pulse width of 1us or less (col. 6, lines 26-30), but fails to teach the substrate is irradiated with the laser light under a condition with a peak power density of at least 1 x 10^8 (W/cm2).

Piwczyk teaches Nd: YAG laser with a peak power density of 9 x 10^9 W/cm^2 for creating micro crack (col. 4, lines 20-40). At the time the invention was made, it would have been obvious to a person having ordinary skill in the art to use a Nd: YAG laser with a peak power density of 9 x 10^9 W/cm^2 for creating micro crack teaching of Piwczyk in the laser processing method of Hoekstra because Hoekstra Nd: YAG laser (col. 6, lines 24-30) can be used for a peak power density of 9 x 10^9 W/cm^2 for creating micro crack for cutting a substrate.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ELIAS ULLAH whose telephone number is (571)272-1415. The examiner can normally be reached on weekdays, between 8AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thao Le can be reached on (571) 272-1708. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Elias Ullah/
Examiner, Art Unit 2892

/Thao X Le/
Supervisory Patent Examiner, Art Unit 2892